Runes 101:
Bitcoins Newest Addition

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Introduction To Runes

Runes were first introduced to the bitcoin blockchain April 19th, 2024, as a part of the 4th ever ‘halving’. Runes were proposed by Casey Rodarmor, the creator of the Ordinal protocol, with the goal of creating simpler, and more efficient, fungible tokens on the blockchain. The idea of Runes is built upon the UTXO model (Unspent Transaction Output), a fundamental element of Satoshi Nakamoto’s Bitcoin design.

Casey Rodarmor describes the Runes protocol as a more efficient method for creating new tokens, specifically designed for “degen” and “memecoins”. Rodarmor indicates that his work on runes is part of a broader interest to decentralize future digital assets and create a grounds for the development of new types of tokens, like those that may be looked at as less serious or mainstream.

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Technical Details

Runes allow for the creation (“etching”), and management of tokens within the network by using UTXO to hold balances of these various tokens, and unlike the existing fungible token protocols on the Bitcoin blockchain, runes leverage the existing, and native UTXO model for token management. Because of the utilization of UTXO, each transaction contains the total assets held in a user's ledger, and ensures that each UTXO can hold any amount of any number of Runes, making it not only scalable, but efficient as well.

The UTXO model , by default, supports efficient and scalable transactions. By allowing for multiple token transfers within a single transaction, Runes can have the ability to significantly reduce the rate of new UTXO creation, or “junk” UTXO creation, caused by token trading. This is particularly beneficial in the context of Bitcoin, where an increasing number of UTXOs can lead to network congestion and higher transaction fees

The UTXO model is central to mitigating the issue of UTXO bloat, which is worsened every time a BRC-20 token, or other fungible tokens, are created on Bitcoin. Runes are able to help reduce the size of the UTXO set that each node in the Bitcoin network needs to track, and helps address the problem of congestion on the network, allowing for more cost-effective transactions.

The UTXO based nature of Runes sets it up well for compatibility with Bitcoin Layer 2 solutions like Lightning Network or Statechains, and could prove to be crucial as fees increase, potentially making it economically irrational to mint or transfer smaller BRC-20 amounts on Layer 1. Runes could offer a more cost-effective alternative for fungible token trading in such scenarios.

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The Rune protocol also includes an opcode called "OP_RETURN", which allows users to attach additional information to their Bitcoin transactions, without having an impact on the network's efficiency. This opcode allows the addition of up to 80 bytes of data to an unspendable transaction, which includes information about the token. The messages stored in these areas (OP_RETURN) are referred to as "Runestones".

Each Rune transaction has the ability to specify multiple operations across different Runes. For example, in a token transfer, the Runes protocol splits the UTXO into multiple new UTXOs based on the instructions in the OP_RETURN data. And each UTXO represents different amounts of the token, which are then sent to their recipients. However, if a Rune transaction happens to fail due to an invalid protocol message, the Runes are burned in order to prevent accidental creation.

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Mining and Etching

“Etching” is the process of creating a new Rune, and involves specifying, and creating details such as the name, symbol (icon), ID, supply amount, divisibility, and parameters related to the Rune's generation and distribution. This step also allows for a "premine," where a predetermined amount of the Rune is allocated to the creator before it becomes available to the public.

Edicts define how Runes can be transferred after etching or minting, and enable batch transfers, airdrops, and the transfer of all minted Runes to a single account.

After etching, Runes are able to be minted through either open or closed mints. Where open mints allow anyone to mint a Rune after the initial etching, while closed mints only allow new tokens to be created under specific conditions (Ex: a time period), after which the minting process ends and the token supply is capped.

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What Does This Mean for Miners?

One of the largest, and most immediate benefits for miners is the reduction in UTXO bloat. As mentioned, the growth of UTXOs, especially from BRC-20 tokens, has led to an increase in the size of the UTXO set. This growth makes it more challenging, and costly to run a node, as miners now have to process and validate a larger number of UTXOs. But Runes, by their inherent process of preventing leftover, and useless UTXOs by bundling multiple token transfers into a single transaction, help to mitigate this issue. The reduction in this UTXO bloat has the potential to lead to a more efficient and scalable network, benefiting miners by making it easier to manage and validate transactions. By doing this, miners can potentially earn more fees from a smaller number of transactions, making the mining process more profitable.

Runes' compatibility with Bitcoin Layer 2 solutions like Lightning Network or Statechains also have potential implications for miners. As Bitcoin fees continue to rise, it continues to become more economically irrational to mint or transfer smaller BRC-20 amounts on Layer 1. The shift in this behavior that Runes could bring could lead to an increase in the use of Layer 2 solutions, which are natively compatible with Bitcoin’s UTXO model. Miners who are invested in, or supportive of Layer 2 solutions may find this development beneficial, as it aligns with their interests in improving the scalability and efficiency of the Bitcoin network.

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Impact on Bitcoin

As Runes help minimize the creation of "junk"/useless UTXOs, are often a result of transactions that do not transfer the full value of an input, they help reduce the on-chain footprint, and have a potential to improving the scalability of the Bitcoin network, making it more efficient to process transactions and manage the UTXO set. By allowing multiple token transfers within a single transaction, and its potential compatibility with Layer 2 solutions such as the lightning network, Runes can help Bitcoin by creating a more efficient, cost effective, and scalable transaction protocol, allowing the network to continue to grow and transaction fees to lower.

The simplicity of the Runes protocol, designed to be user-oriented and independent of additional data such as Ordinals or Stamps, can also contribute to the security of the Bitcoin network. As Runes minimize the potential for errors, and failed transactions in processing (such as how they burn invalid protocols), they may also help to reduce the risk of certain security vulnerabilities associated with some of the more complex, existing protocols.

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Challenges & Speculations

While Runes have so many potential benefits, they do come with their challenges. The adoption of Runes contains its challenges, as they lack a unified standard, which could lead to fragmentation and different paths for implementation. This fragmentation could complicate the development of the Runes infrastructure, and could potentially impact and affect the network's scalability and security.

With the anticipated increase in fees, Runes could quickly become an attractive option for fungible token trading, and could potentially lead to a shift in trading volumes moving away from BRC-20, and towards solutions such as Runes.

With the Runes protocol already attracting significant attention from inside the community, and miners spending over 80 Bitcoin of fees to acquire these tokens, it’s evident that the Runes protocol could have a significant benefit on Bitcoin’s fee economy.

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